

5 Aug 1943

Abbreviated Interrogation:
5G-55MA

No. 356

HOELLER, Josef - Oberfunkmaat (U-113)

Interrogated by Lts. Mershberger & Bauer

Authority

EO 5350

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Q. We have already talked about the transmitter. Tell me, was it a crystal or an electronic transmitter?

A. Electronic. There were no crystals in it.

Q. Do you think that electronic control is better than crystal control?

A. No, I don't but crystals are scarce in Germany. The electronic control works very well, however.

Q. Did you have any trouble with the frequency shifting from one side to the other?

A. No, none at all. Each transmitter has a frequency control set for the purpose of calibrating.

Q. How was that?

A. There is a frequency control set with every German transmitter, every navy transmitter. We can do it ourselves but we are not supposed to do so (calibrate). It is done by the manufacturer, by Telefunken, for example. We never had to do it on our boat anyway; it was not necessary. The frequency was always exactly correct according to the scale.

Q. What is the difference between CW and tone?

A. The broadcast transmitters use tone, the navy transmitters use CW. The latter is hard to hear on an ordinary broadcast receiver.... short wave.

Q. Do you have a switch on your receiver to improve the reception of weak code signals?

A. No, the receivers are quite simple. We have such receivers, of

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course, the so-called Lorenz receivers but not on U-boats. The Lorenz receivers are all calibrated to kilocycles, not to degrees. The Telefunken transmitters and receivers are calibrated to degrees.

- Q. How would you go about contacting another boat? Do you send Victors first?
- A. Yes, with beams, Victor, Victor.
- Q. How long would you send that?
- A. For one minute, after that the U-boat's radio-name and code-name. Afterwards we continue with Victors for five minutes and every 15 minutes thereafter, e.g. from the hour to five minutes past, from the quarter until 20 minutes past the hour, from half past until 25 minutes of the hour. It is frequently changed.
- Q. Do you have different ways and means of.....?
- A. Yes, there are other ways and means. Groups were given from the signal book. That was very, very complicated. In that case the boat answered on long waves. They were on the long wave transmitter, too. That came from the signal book. I don't quite remember how it works. All the boats we contacted we were able to meet without using direction-finding (Peilerei). This device should only be used in cases of necessity as a last resort.
- Q. Were you in direct contact with other U-boats or always only in contact with the control station?
- A. Always directly with the control station. Naturally the other U-boats can listen to my transmitting, too. They hear and decode what I send but the actual traffic goes through the control

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station. The control station is, of course, best equipped for it because all the bands converge there.

- A. The "Peil"-receiver is used for the ultra-long waves for under water reception.
- Q. What are its wave lengths?
- A. From 200m. to 20,000m..
- Q. What was the frequency range of the reserve short wave transmitter?
- A. From 17 or 18 up to 100 meters.
- Q. And the long wave transmitter?
- A. From 300 to 1000 meters, I believe. That is not too accurate, I can't recall it exactly because it isn't used at all.
- Q. Do you receive short waves only?
- A. Only short waves and transmit short waves only, too.
- Q. But you can also receive the ultra-long waves?
- A. Yes.
- Q. But you can't send the ultra-long waves?
- A. No, they can't be transmitted, received only.
- Q. What kind of a message do you send when you search for another U-boat with a Peil-Geraet?
- A. That varies. It changes approximately every three months. There are red printed sheets for that purpose in the NBU. Then we send Victor, Victor ...-...- ; that's the way it is in operation now, or the way it used to be. I don't know whether it has changed in the meantime. Then the name of the called boat, the encoded

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name is given. This is encoded by the M code machine.

Q. Which name is given, the name of the dalled boat or the calling boat?

A. That is ordered by short save. When two boats are looking for each other, the order comes from the coast station. One boat sends the signals and the other sails accordingly.

Q. Can you use the direction finder under water?

A. No, I need an auxiliary antenna for direction finding. The antennae are vertical and can be raised under water. On the left there is a fourth antenna, a pole antenna, a telescoping-pole antenna. It is to the left of the conning tower. It is a long pole

which is visible at all times, it is rubberized, completely covered with rubber. It is screwed on there; on the bottom is a kind of cuff which presses it tightly together so that no water can leak in. From the control room I can raise this antenna to an approximate height of 6 or 7 meters when the boat is still submerged. When I have to transmit under water, I drive out the pole antenna. Only a small piece of the antenna needs to protrude from the water. I can then remain under water, connect the pole antenna to the transmitter and send my message. I quickly switch the antenna over to the receiver and am able to hear under the water whether the message was received correctly. We do not need to come to the surface.

Q. What kind of antenna is that?

A. A pole antenna, a telescopic pole antenna. It is put up almost like a periscope. It is as thick as a periscope. It works in

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such a way that the cable winds and unwinds as the antenna is pushed out and in.

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- Q. Naturally you have seen this one already, haven't you?
- A. Yes, do you want me to explain how it operates?
- Q. Yes.
- A. I can tell you that. Look, there are 4 discs in it, 1,2,3,4, and on these discs as we see them here, there is the alphabet engraved from A to Z. There are 26 letters, A,B,C,D,E,F,G, these 26 letters can be adjusted.
- Q. How can they be adjusted?
- A. Here are the 26 contacts; here are brass contacts. You can see the contact pins here. The pins make contact on these brass contacts. They are provided with springs. This is the way they make contact. They work in 4 volts. For instance, when you press a key, the first disc moves. This one is the first one, the one on the right, when facing the cipher device, this is the way it appears 1,2,3,4. This disc moves every time. When the 26 letters are used up, then this one moves only once, one prong only. There are the prongs, that's the way it is jagged. One prong meshes and then the discs are forced around, 3 discs. Of course, all the discs are not in there. For instance, today disc 2, 3, and 5 are being used currently. I have no means of knowing since I don't have any any particulars. When working, one has a prepared form with everything on it, including a code word. For instance, a code word like "Agressor" or "Answer" or "Frankfurt". For example, on the slip it reads, disc 2, 3, and 5, and

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Schlüssel "M" Printing Machine
(U Boat Issues)

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the code word, "Frankfurt". That tells me if 2 is used with the code word, "Frankfurt", that it is in practice 4; and if 5 is used it is disc 7. That's what the code word is for. Do you understand that? Naturally, all I'm telling you now is theoretical, because that is done first. Naturally, I can't tell you what is in use now. I don't know myself. I don't know what's on it. If I had it, then I could explain it to you clearly. The code word is never written down on paper. The code word is only given orally, it is never written down.

Q. Never?

A. Never. The letters are naturally on the discs. Yes, here is the white dot. You can see a little white dot on the photo. There I adjust now C, and B. Now the disc is adjusted to B. The letter B must be here, in front of this little white dot. Now the disc is adjusted to B. It can also be adjusted to Z at 26. This key here naturally serves another purpose. It has a mechanical purpose. This is the way it functions. The 3 discs which you see here form the disc block, which is inserted. It is the so-called Beta-disc. Nowadays, there is also a Gamma disc. We had this one, too. However, this disc was not in use while we were at sea. Naturally, I do not know whether it is in use now or not. This one is permanently adjusted. Naturally, it will revolve eventually, when the message is so long that all the letters of the alphabet on the 3 discs are used up. Otherwise, it is stationary.

Q. If all the letters on a disc have been used up, can new ones be adjusted?

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- A. No, there is no need of that. Listen and I shall try to explain. When I encipher a message, I first get the identification-group book. One naturally has a radio procedure book. Triton, for instance, is the Radio Procedure Book for U-boats. I do not know what the others are. Code words are selected, from the Identification group book. Neptune contains the numbers 215 to 645. Let's say that I select 322, for instance. I look up group 322 in the book where the letters are found. I then select Richard, Tony, Fritz, which is a letter group. There is still another procedure with groups, which is called general procedure (Verfahren allgemein). In this case, I select Tony, Sofia, Max, a typical code form. The radio message blank is divided. Now here I have 3 (?). The top 3 and the lower 3 of the general procedure. Here I add another block for this letter, a consonant. For Max, I add arbitrarily. Now I have the identification-group. I take a so-called cipher card (Tauschtafel) which is changed every 24 hours at 12 o'clock midnight. The code machine is readjusted daily at 12 o'clock noon.
- Q. Every day at 12 o'clock?
- A. Yes, every day at 12 o'clock the code machine is given a new adjustment. Other discs are inserted. The discs and the plug connections which are here in front are adjusted differently. There is a plug box, a kind of panel board, where the electrical adjustments may be changed at will. This is also according to directions from a list. For instance, if I read that the plug connection is 12-14, the code word indicates that I must add 7 to each number in order to get the proper connection. This also is only done orally; it is never written

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down.

Q. Where do you obtain this?

A. The verbal order in the U-boat service comes from the Adjutant, the Adjutant of the Flotilla Chief; no, not the Adjutant but the Communication Officer. In every Flotilla, there is a Communications Officer who receives it by a messenger who also brings all the references (Unterlagen). These are not sent by mail. He flies by plane through the vicinity and brings this material. The mail does not handle it. everything is written on water solvent paper, and the least amount of liquid will make the writing disappear. All this material is red and also written in red. The writing is in a somewhat darker shade than the paper. If only one corner is touched by water, it runs and all the writing disappears. This works as follows; I now have the identification groups, with the cipher card, which is build up in this way underneath. Here we have Anton, Bruno, Anton, Max, Anton, Zet, Anton, Richard. Now I pick them out just like a soccer goal, as they say in the Signal School. Encoding is taken off vertically, written down horizontally. Decoding is taken off horizontally, written down vertically. When I encode, I pick the letters as follows: Sofie, Tony, Zet. I have here Sofie. This is naturally A,B,C,D,E,F,G,H, Sofie Tony equals Richard Max, this is also, of course, Now Sofie Tony is in a vertical position, beside them I write Richard Max like this. And Richard Sofie, there is the whole alphabet. Then it continues according to the card, which is a big card, as simply as it is here. Richard Sofie equals Tony Uly; I write that Uly here, and

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that's the way it goes. In any case, these 8 letters are written down like that in code. Now I have the identification groups, which are transmitted, for instance Sofie, Nanie Z X and these identification groups are transmitted at the beginning and at the end of the radio message.

- Q. At the beginning and at the end?
- A. Yes, there are always 8 letters; the BD knows that definitely.
- Q. When you transmit the whole message, it is always in 4 letter groups?
- A. Yes, there are always 4, always 4 below each other, and at the end we have the upper 8 letters again and all the points, always 4 side by side. And from these here I derive later the radio code. Until then I hadn't had anything to do with these things. Now we have a daily adjustment for it like the one you see here. Here it says Zet, Sofie, Anton, Nanie. Let's assume this is the daily adjustment from which it originates. Now I have Z, Sofie, Anton, Nany, and encode, Richard, Max, Tony, Uly.
- Q. How many letters?
- A. When I get Z Uly, Nany, Sofie out of it, for instance, I set Z, Uly, Nany, Sofie on the instrument here. First I have pressed on these 4 letters and there, on these bulbs, - there is a bulb below each just as you see it here, Z, Uly, Nanie, Sofie have lit up, and what has lit up, I adjust up here and by doing so, I encode the given message. Is that clear? Do you understand it?
- Q. You say, as soon as you have these 4 letters, you start to transmit your radio message?
- A. Yes.
- Q. Do these 4 lights remain lit?

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A. No. No, they don't remain. That is only for my adjustment, the highest ones, not the lowest ones. Richard, Max, Tony, Uly. Now I have Z, the adjustment which I make here is Z, Sofie, Anton, Manie. There is a little glass up here in these windows, and the letters from the discs shine through it. I adjust, as you see it here, Z, Sofie, Anton, Manie and press these things. It has nothing to do with the adjustment on the inside. The code machine is locked up, nobody can get to it. You can see that the machine is closed so that you can't open it. These things protrude up here, and can be turned. I adjust it, using the daily adjustment, I type the encoded message. When I press 4 keys, corresponding to the encoded letters of the message, 4 lamps must light up. Naturally they only remain lit as long as I press the keys. When I let the key go, the letter disappears. After writing down the 4 letters which come out and adjusting them up here, I start to type out the clear text as one would do on a typewriter. Another fellow sits next to me and writes down the letters.

Q. Whatever lights up?

A. Yes, whatever lights up, he writes down.

Q. I see.

A. Nowadays, we don't do it like that anymore, we don't write the letters down anymore. You set up on top a special instrument, an auxiliary instrument which is called "Code Machine M". It has a little motor inside. When the switch is on, it runs and writes everything on a ticker tape, like a teletypewriter. That's the way it comes out.

Q. That is not as it is here?

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A. No, no, that has nothing to do with the code machine itself; it is only a device, which writes it down automatically so that one doesn't have to sit there all the time watching and writing. It's much faster that way. One can sit in front and write it down, encode the text with flying speed and then paste the tape quickly in here, always 4 side by side, the machine makes the intervals after every 4 letters. Then we have the big interval, again 4 letters and again a big interval. A radio message of 40 groups takes about 4-5 minutes.

Q. 4-5 minutes?

A. Yes, approximately, sometimes one can do it faster, too.

Q. Who gives you the text?

A. The Commanding Officer hands you the text and his name is usually included in the text as signature.

Q. Not the U-boat's name?

A. No, not the U-boat's name; well, one may take the U-boat's name, too; that depends on the radio operator. I, for instance, can also put the signature in front and then write Instead of writing V twice, I can take VVV, too or I can take the letters from the U-113, but the numbers must be written out, one, and so on. There are no numbers on it, that's why they have to be written out.

Q. Do you give the time when the messages is sent as part of the message?

A. No, no, there is a time-group. What's today's date?

Q. The fifth.

A. Well, that is line 5, line 245. That is the watch time in which the clear text was handed to the radio room. This is the date and that is the control number.

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- A. For example, on the Ireland wave band the numbers range from 100 to 200. Then the first radio message gets the control number 100, the second 101, the third 102, and it continues this way until 200 and then it begins all over again.
- Q. How is that? You have this number?
- A. No, only the land control station has the right to assign the control number. The radio man may not. If I send a message at sea, then I may only....the time, 12:45, the...stroke and 5. And when I have sent a radio message, the control station repeats it immediately. Then the control station assigns (adds) this control number and I maintain a control number check while at sea. One has form sheets, one writes the control numbers in the proper place, so one has a check that all radio messages have been received. Because boats dive too. For example, when we dove, the last control number was 107 and when we surfaced, then the next control number might be 120. Then I know exactly that I missed so and so many radio messages. And then there are programs on ultra-long waves. For example, there is a program at night from 0 to 3 hours, ultra-long waves, on the Ireland band. Then all radio messages of the day are repeated. Then I tune to ultra-long waves and take it down. Then I get all of them. It is so arranged that one can get all radio messages even when one is submerged. 2/3 of the day. They are naturally also repeated -short wave. For example, the message is sent at this moment, in 2 hours the control station repeats it, in 4 hours again, in 6 hours, in 12 hours and if they are important, they are again repeated in 24 hours. And if very important, then in 48 hours again. From this you can always deduce that a radio message is definitely important if it turns

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up again after 2 days. That can of course be important for the general situation or for the boat alone. One cannot tell superficially from the radio message whom it affects. Therefore one has to.... every message, for there is no address via the radio, that's in the encoded material. One cannot tell from the outside for whom it is.

Q. You read all?

A. Yes we take down everything on the wave band in use. We distinguish between a U-boat coast wave band, Ireland wave-band, America wave-band I and II, and an African wave-band I and II. And then there are the wave-bands North Sea and Mediterranean Sea. I don't know anything about them because I had nothing to do with them.

Q. Oh, they have all.....

A. They have....communication sections. Then the order comes: Czechan, tomorrow morning, 8 a.m., Ireland wave-band. Then I tune my short-wave receiver to Ireland wave-length. And here the control number is 100 to 200. The Africa wave-band is, as I told you already 200-300, 300-400, 400-500. As far as transmitting goes, I can naturally use any wave-length desired. That's not important. If I wish to transmit, I can hunt out the most suitable wave-length, the one I receive best. For example, if ..comes through poorly, then ...can use America I, but for receiving I've got to stick to Ireland wave-length. But for transmitting I can take America I or Africa I, or on....or the Fleet wave-length because the control station knows the boat is receiving on the Ireland band. And the answer I eventually get comes on the Ireland band. And the radio message is switched into the Ireland "system" with another control number. The control station on land does that. It guides the whole traffic.

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Q. When you send a message, do you call the radio station?

A. No, I go.....

Q. How often?

A. Once. When I transmit that once, then I see what happens to it.

If the control station has heard me, it transmits immediately and repeats the message. Then I can check if it has it correctly. Then

I leave the receiver tuned as is and can correct the groups. If they have heard various things wrongly, for example, I say "W 45" and repeat the group. Then the control station says "W 45" and repeats it again. If only one letter is out of place, then this is not done.

But if a great deal is wrong, then one starts to correct or one makes RPT and repeats it. Usually one makes a brief pause after giving

the time. Then the control station comes in if it is receiving clearly and says, "I hear at amplitude -", and then follows the number which is the amplitude at which one is getting it. If it receives very badly, only 0 to 1, then it cuts in and doesn't want the message because it can't receive it.

Q. Oh, it can't receive it?

A. It can't because I come through so poorly. When I try another wavelength.

Q. The land station answers?

A. Yes, it always answers. I, of course, don't ask. I radio as little as possible. The basic principle at sea is - radio as little as possible.

Q. Where do you place this time-group? Is there a definite rule for that?

A. Yes, the rule exists when the.....comes.....radio room, I write down the time. There, I have now put in the time-group. That's the time

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group. Then comes the number of groups. I give the time groups twice and the number groups three times and then the clear text once and at the end of the clear text I make- (JA)

Q. That comes right at the start?

A. Yes. It is given as it is here. Thus: 12:45 -5-245-245. Then I make a brief pause, then I transmit 45. Then he knows that is the number of groups. When I give the 45 groups that I have .

Q. And you have that in code?

A. This? No, it is clear-text.

Q. You radio that in the clear and the answer?

A. The code only begins with the letters, all the rest is clear text.

Your....knows that..also. One finds that out just as I could hear the English after a short while. Naturally we couldn't decipher it. They then went to Berlin to the G.K.M. and were evaluated. At that time one even decoded them. I know that by chance. Just as the English X-groups, X45 or X52, they have a fat book with all of them in it. And these Q signal groups, like Sophie-Anton, Q Richard Paul naturally aren't secret because everybody knows them. In peacetimes they are made known. In peacetimes, for example, the radioman who knew the most Q signal-groups was the best. There was a constant conflict with Q signal groups. It didn't matter then, we could listen as much as one wished. And then they called each other names with Q signal groups. And the radio man who knew this best came off best.

Q. As, for example, nonsense M-A. Right?

A. Q Signal-Max-Anton, no there aren't any there. I really know very little about these things. I knew all right, but not the meaning.

Q. That is really a French system. All amateurs use it. It was developed in France.

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- A. It is, of course, different in wartime. One draws a line between war and peacetime radio procedure. The coding per se was just the same in peacetime, only with different codes.
- Q. And when do they encode that?
- A. When is it set? Every day at noon.
- Q. And when was that?
- A. It's valid from then on, no, it's valid from 12:00 midnight. The setting changes at 12:00 midnight. Only the plug connections go in here. They change at 12 at night...settings change at 12 noon.
- Q. That is in the.....
- A. Yes, one opens that up, pushes it open and takes these 3 cylinders out. The fourth stays in. Then there are springs there. One reaches in with 2 fingers and presses the springs, then one can turn that. One can arrange the letters according to the alphabet there. Really only an officer is allowed to do that. That is really something obvious. And only an officer may set the key word. The officer alone may know what the keyword means, whether it has 6 letters or 10 or 12. But in practice on a U-boat the radio man does that. He sets it. The officer usually has no idea about this or little and doesn't bother much about it. The radio mate does that. Also when something is broken, the spring behind, for example. There is some sort of rubber there which presses it forward. Eventually the springs will lose their elasticity and one has to put in a new spring. Or these contacts become worn occasionally and have to be renewed. Those are brass contacts.
- Q. What wave lengths do you have? What frequencies?
- A. There are a whole lot. I don't know them all. There are a lot and

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they change according to the seasons. There is a winter listening plan and a summer listening plan. That is not so much for secrecy but because the wave lengths are good in summer or winter.

- Q. They are about 1000-
- A. Kilocycles. Well, that varies considerably. It depends on the wavelength. For example, on the coast. There is only one coastal wave (length). That is K-Otto. That is 4855 kilocycles. That's the coastal (wave length). It has an alternate wave length, but I don't know it by heart. That's all in the so-called NBU (Nachrichten Bestimmungen fuer U-Boote) Communications Directions for Submarines. Its all in there. Since that is changing all the time one can't learn it by heart. At the end, for example, Ireland has 6 different wave lengths within 24 hours. At noon from 12-4 it is Paul-Ulli. From 4-6 it is the turn of Richard-Max. That was not for maintenance of security, because this wave length comes through best at this time of day in those areas where submarines use the Ireland wave band. That's why this is done. Naturally the U-boat wave bands in America have their wave lengths. America I and America II. I believe America I has only 3 wave lengths. I can't vouch for that. One can't keep that all in his mind exactly. One has books and looks everything up, then one sticks close by the short wave transmitter, takes a sheet of paper, writes it down and hangs it on the receiver. When wavelengths are changed - the control station, for example, at noon from 12:00 to 12:05 radios Viktor..... call name. The land stations have call names. Gustav-Viktor, for example, is Borkum. Borkum is the control station for this wave length, then it radios from 12:00 to 12:05 Viktor's with....call names so that one can adjust the trans-

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mitters and receivers in those 5 minutes. Radio silence is maintained the next 5 minutes. That is provided for the boats at sea to deliver any important messages. Then the men on land concentrate to their maximum and watch most carefully to see if a boat is radioing. Then brief signals are sent. Brief signals (Kurzsignale) go fast, consist of just a few letters. It is quite different from radio messages and is also done by machine. One can send letters in fours, as, for example, Max-Hans, Fritz, Dora means "I have crossed 45 degrees north." Only the 4 letters are sent. That is then a long sentence. And that is of course again encoded and naturally comes out quite differently. And then one has still other settings for it up here. Inside and out the plug connection stays, but up here one sets it differently. That is also in the book. That is all on this water solvent (Wasserloeslichem) paper. As soon as water touches it, it is gone. Obviously, for example, when we were sunk. Into a sack with lead weight, and then it is tossed out. One takes out the cylinders from the M key, puts them in his pocket and throws it away. I was ready to destroy everything, but I didn't do it because it wasn't necessary. It is, of course, very difficult, if they don't know how that is done. If you have no bases to work on, you can't do anything with it. Such a coding device has, I believe, 15 million possibilities. And by the time you have made 15 million tries, a year has passed. So it is very difficult to break. If one lacks any working basis it is, from a practical standpoint, impossible. One can, of course, hit upon it by chance. Look, here are 24 cards. Here these 4 cylinders and each time 26 letters. And here again 26

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letters, and here these identification groups....as an additional extra. If one has a working basis, and, of course, it happens that radio men make mistakes. If they make a real mistake, even we can't decode it. Then they make slight errors, then one sits down and works it out, but generally that can't be done either. I've tried it already, but generally it can't be done. The control station after reception radios: "Radio message decoded." The control station often makes errors too. It is done in a very complicated fashion and very neatly so actually all messages get through. It never happened to me on any trip that I missed a radio message. If, of course, a lot of messages are missing....It has happened that radio men have been short 60 to 70 messages on one trip. That has to be reported. One writes when one puts into port, the so-called communications report. The station chief writes that. There is a prepared form on which are A, B, C,. A deals with the quality of the wave lengths, B the quality of the means of communication, C the efficiency of the radio crew. One can then write a long report if that was satisfactory or not. And in the report one must also state if radio messages were missed. Then one gets a black mark.

Q. What happens then?

A. Well, the commandant writes an opinion on this too, and a lot depends on that. If the commandant writes that the radio men were themselves to blame, because they didn't pay attention, one is jailed. If he writes that it was caused by conditions, we were submerged a great deal, nothing else was possible, it's all right.

Q. Could you receive when you were under water?

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- A. Yes, under water we received on the ultra-long waves.
- Q. What was the Frequency?
- A. I can figure it out for you, they are 12, 13-14000 meters.
- Q. 14000 meters.
- A. Yes, very long waves. One has to go very slow, otherwise they will not be clear.
- Q. Oh this is underwater telegraph.
- A. No this is radio. They are extremely long waves 13-14-15,000 meters. This would be 20-21-23-kilocycles. There are extremely powerful transmitters, 150,200 to 1,000 kilowatts and these penetrate a certain depth into the water. Of course you cannot hear them when you are 20 meters down, but around periscope depth 14-15 (?) meters, they still penetrate.
- Q. How far do these go?
- A. They travel far, one can hear them everywhere over the water,
- Q. How many kilometers?
- A. Everywhere. I have never experienced a situation where one could not hear them. Invariably they go all around. The transmitter is so strong that they penetrate everywhere.
- Q. 1,000 watts?
- A. 1,000 kilowatts not a 1,000 watts. We already had an 800 watt transmitter on our boat.
- Q. A short-wave transmitter with 800 watts?
- A. Yes
- Q. How much was the long wave transmitter?
- A. This was only 150 watts. You do not need a longwave transmitter on the boat. It is only there for emergency in coastal areas and

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to send out radio location signals. If 2 submarines are supposed to meet and can't locate each other then one of them sends the location signal, Viktors, with the secret radio name and the other boat follows the beam. Then they meet. For that reason only is there a long-wave transmitter. It has a very limited range. It is specially made so weak so it can't be heard on land.

Q. You have a long-wave transmitter and what else?

A. A short-wave transmitter to an auxiliary short-wave transmitter, the latter has 40 watts and in a normal U-boat the short-wave transmitter is 200 watts, but we had one with 800 watts. This was a brand new, automatic, 800 watt FKW transmitter. You set the frequency and a motor runs it and all that is then set automatically. It is adjusted to kilocycles. Then I switch in the coarse adjustment, which must be switched in and the fine adjustment is a small wheel which adjusts accurately to kilocycles or adjusts the transmitter to the frequency of the receiver. And as I turn the small wheel, the motor there also remains fixed. It then adjusts the antennae tuning everything automatically. Then the transmitter is tuned. That takes about 2 seconds.

Q. Is that Telefunken?

A. Yes, very modern with automatic adjustments and a voltage network. You don't need a dynamoter. That is in part a rectifier. The rectifier furnishes all the voltages, direct and alternating current and whatever else is needed. It is supplied with 220 volts A.C. current. There are the dynamoters. On the boat itself there is only D. C. current.

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- Q. You have a dynamotor?
- A. Yes it is 6 K.V.A., and I switch it on, then the rectifier. In that moment the rectifier has all settings for the transmitter. There I have all the controls at the transmitter to see whether all voltages are there. A small red light always flashes then. If the transmitter doesn't function, then know there is no voltage. Then I take the drawing, open it and look it up. The transmitter is actually terribly complicated through this automatic part, ~~but~~ it is easy enough to locate trouble. Because one has very detailed drawings and through this control system.
- Q. If this motor breaks down, can you set it by hand.
- A. Yes. Naturally there are knobs there.
- Q. Maybe it works better by hand?
- A. The motor definitely operates it just as well. It is adjusted so well. It works with a disc. I can't describe that accurately to you. There is a round disc with raised parts and it guides the motor with a railing. The transmitter is so constructed so one can remove each separate part. For example, modulation section, one sets everything at zero, raise a lever and then pull everything out. So one can get at every single part. One doesn't have to remove screws, etc. It is wonderfully made. These 200 watt Telefunken senders also have it.
- Q. And did you have an 800 watt transmitter?
- A. Yes.
- Q. You had a long-wave transmitter and a 800 watt short wave transmitter and a reserve short wave transmitter?
- A. Yes every boat has those. Every boat has a 150 watt long wave trans-

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mitter and a 40 watt auxiliary short wave transmitter.

Q. What sort of a receiver do you have?

A. A short wave receiver, a special short wave, an all wave receiver and a direction finding receiver.

Q. All wave receiver?

A. Yes, with this I can receive long and short waves.

Q. What is the FU. M.B. ?

A. FU. M.B. This is very complicated. This is the dipole.

Q. Dipole?

A. A round dipole. This wire screen goes through this. Here it is broken and here in between is located the insulating block. There are also two rods that extend upwards on both sides. They are so long, 45 cm. It is insulated, of course. Here is a piece and here is a piece, and a little further on they come together. This is also insulated with porcelain. A wire leads into this from here and here. And up here to the lock and then a cable leads through a waterproof pipe to the boiler room. The metox is in the radio roomthe cable is hidden there.

Q. Metox?

A. Metox. One hides it in here. There you can listen to horizontal and vertical locating beams at the same time. Very simple, one can not turn it or determine directions by it, it is especially constructed only to receive location beams. There are two round rings one above the other..... This is the upper ring and that is the lower ring and in between is the wire net. The 2 poles stand on both sides. For instance, there is the insulating block and the poles stand well above the insulating block to the right and left.

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Q. How big is it?

A. Well, the diameter of the circle is about 35 cm. and the height of the poles is 45 cm. The distance of the netting through the individual rings is about 10 cm.

Q. The condenser is not too good, is it?

A. They are small condensers like tubular condensers. They short circuit. They are American condensers which had been found in Paris. The Metox Firm in Paris had a stock of all these things and we just took everything we needed, of course. The resisters.....carbon resisters. Naturally we also have other sets in Germany, too. The sets that are being built are primarily stable and durable. I believe the Americans are technically more advanced, but in Germany it is a basic principle to see to it that things don't go to pieces. For instance, when our transmitter.....by bombs, it was still running just as well afterwards. The bulbs were broken by the concussions, they were not so strong, but it continued to work nevertheless. Also the short wave receiver was still functioning and not even a tube was broken in it.

Q. Is that so?

A. Yes they are very strong. For instance, the shortwave and the general wave receiver never break down. I have never seen one get out of order. Occasionally there would be a rather bad.....but..... nothing bad enough to put it out of order.

Q. How do you have the tubes....steadied? Are they actually inserted?

A. They are swinging sockets.

Q. Swinging sockets?

A. Yes, when you touch them everything shakes. It is based on rubber.

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- Q. How many spare tubes do you have?
- A. There are 7 tubes in the short wave receiver.
- Q. Do you have extra tubes?
- A. Yes, naturally. They are on board. For every part we have spare tubes. Every radio operator tries to have as many tubes as possible.
- Q. What are the frequencies?
- A. They go from 120-240 cm.
- Q. That is the wave length?
- A. The frequency range of the receiver.
- Q. Is it always a disc?
- A. Yes, which is turned. It is a stupid job, believe me. I had to be at it all the time because our CO would not let any one attend to it except the "Obermaat". We sat there like idiots, doing nothing but turn the thing until we were nearly crazy. We used to always have a book with us to read, but we weren't allowed to do that anymore because we had to watch the magic eye.
- Q. What is the purpose of the magic eye?
- A. The magic eye is exactly like the one on a radio set.
- Q. Do you have it in the Metox?
- A. Yes, it is on every Metox and is, of course, being constantly improved. I am thoroughly convinced that all the U-boats that are now operating are equipped with something different. They have something different because what we had was incomplete. These changes will have transformed everything again. A radio operation on U-boats along the American coast was the first to stumble upon the idea of the magic eye. He discovered it and the technicians have recently improved it.

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Q. What is his name?

A. Storch. I went to school with him at Gotenhafen.

Q. What is the name of the tubes?

A. ~~EL I~~ ^{EL II} tubes are proper for the magic eye. It proved itself. For instance, when we had unmodulated beams. After we dived, the bombs fell close by shortly afterwards.

Q. How did you happen not to see the plane?

A. The Metox on the sub was not being operated at the time. It was day. It was pretty clear, so the Commander said switch it off. He always had a crew on it at night but not in the daytime when it was clear. That's how everything happened. It was not my fault. When the Commander says switch it off, then I'm glad to do it.

Q. Does the radio operator have much to do, when you travel under water.

A. No, the radio operator has nothing to do under water. One operator is always on guard who sits on the GHG. But otherwise he has nothing to do.

Q. How is that nowadays?

A. Everybody has that. There are 48 receivers, 24 on each side. They are mounted on here, in a circular fashion, not so ~~small~~. That's how big they are. Round, really round.

Q. What is the diameter approximately?

A. 15 cm. They are of very sensitive material. For instance, they can be demolished very easily, when the boat is in dry-dock. One has to be very careful with it. Nothing happens to them in the water. They all are connected to an amplifier. There is a so-called pre-amplifier for each receiver ~~larger~~ has first an amplifier

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tube. That is the V-12 B-2000 tube. That is the strong one. They are the so-called army tubes. And each pre-amplifier has 24 tubes. And leaving the amplifier, the 2 pre-amplifiers join in the main amplifier. This one is constructed differently. There are 4 condensers..... in it and then there is the wheel in the circle, also.

Q. Did you have better results when the U-boat was traveling in this direction or when it traveled parallel to the ship.

A. Naturally better results are obtained when you travel in this direction. One also has very good results when the U-boat is traveling parallel, however naturally it is better this way. The basic principle is naturally very complicated, a lot of wiring all tangled up, which all led into a large case. The cables lead from the case into the listening room. They are marked and numbered so that when a receiver breaks down and does not work it is tested with a variable indicator (Kurbel indicator) or with an ammeter.

Q.variable indicator?

A. The variable indicator indicates a very high current, with an induced current. Each individual receiver is tested thus indicating instantly which one is not working, then it is simply disconnected. If half of the receivers are out of order, the apparatus still functions.

Q. Then it is not so good?

A. That is understood but it still functions. The receivers are simply disconnected at the case, this being very simple because they are all marked.

Q. Now let's assume there was another U-boat in the neighborhood, that would be indicated by your receiver too. How can you determine

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whether there is still another ship in the neighborhood?

- A. Yes, one can tell by the noise. One naturally can distinguish between screw noise, Diesel motor noise, Electric motor noise, turbine noise, and piston noise. One finds out these things. When for instance a merchant ship with a steam engine passes, one can tell that instantly. If you count the revolutions with a stop watch for half a minute, you can calculate the ship's speed.
- Q. Can you also detect airplane motors with it?
- A? No it only works in the water.
- Q. Can you listen to underwater telegraphy with this.
- A. Yes you can hear it very well. However, you can also hear that very well with your naked ear.

- A. The Russians are ruining us. If it hadn't been for them, the Americans would never have reached Sicily.

(P/W had often attended courts martial)

A total of seventy-five years of imprisonment was handed out in one day by the court martial in Bordeaux. One man had stolen a spoon and was given six weeks for it. In occupied territories the sentences are particularly severe for they want to maintain discipline and morality at a high level. If one hits a Frenchman, for example, he gets at least a year in jail.

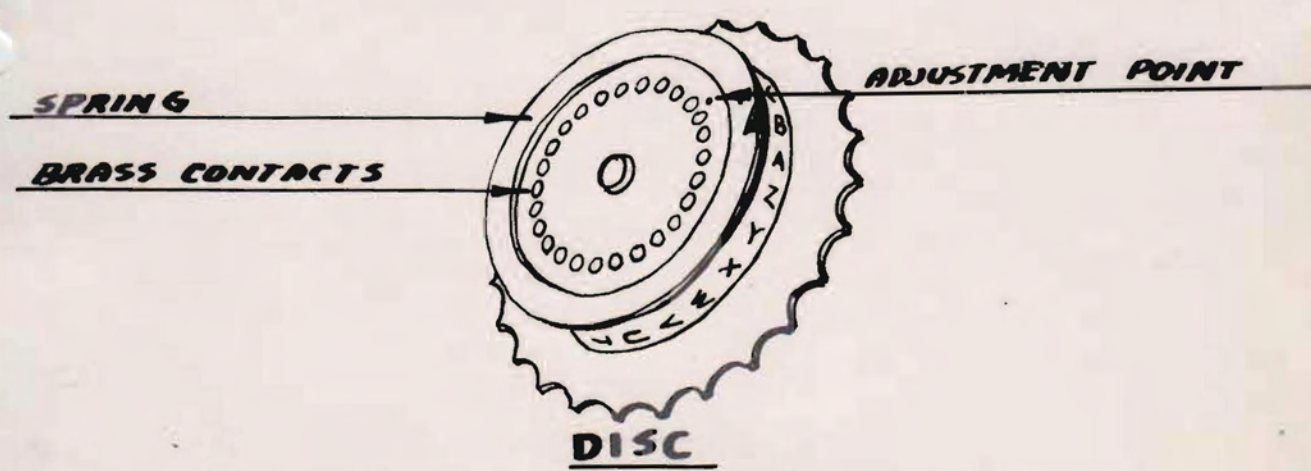
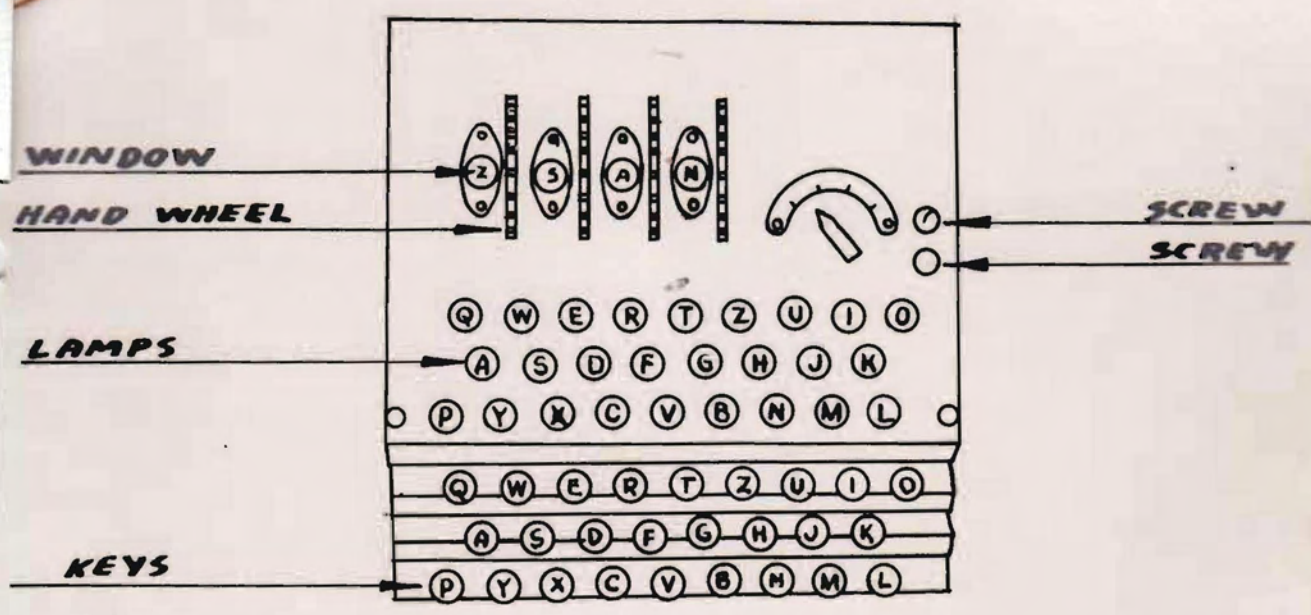
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#124-A

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CYPHER DEVICE SCHLUESSEL M.

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EXPLANATION TO ENCODING PROCEDURE

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SCHLÜSSEL 4



FIGURE I

N	Z	K	T	X	R	S	T	1
N	X	T	U	S	M	H	Z	2
N	Z	J	H					3
								4
								5
								6
								7
								8
								9
								10
								11

← TRITON GRUPPE
← GRUPPE "ALLOHEIN"

FIGURE II

BUCHGRUPPEN **BUCHGRUPPEN**

Code Text Clear Text

Aa	=	rn	Ba	=	rt
Ab	=	rz	Bb	=	at
Ac	=	sm	Bc	=	nf
Ad	=	xn	Bd	=	xf
Ae	=	st	Be	=	hl

TAUSCHTAPEL

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6 August 1943

Abbreviated Interrogation
5G-551A

No. 354

HOELLER, Josef - Oberfunkmaat (U-118)
Inter. by: Capt. Kretzmann

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Abbreviated Interrogation of:

August 6, 1943.

5G-55NA
No. 354

- A. I have come to the conclusion that it looks hopeless for Germany. These many air attacks on Germany! So many people, especially women and children, have been killed thereby.
- Q. Have you heard about what has happened in Hamburg recently?
- A. Yes. That is very significant for me. To recognize this huge air superiority which the Allies have at the present time.
- Q. On humanitarian grounds I deprecate the air raids on German cities as much as those upon London some time ago, perhaps even more so. If you can be of any help to us, perhaps we can get you away from here soon.
- A. It is difficult for me to make this decision, of course, but I have thought it over very carefully again. It is better this way. I don't want any personal benefits from it, that is clear. I will write down all these things. The whole business doesn't have any value for me anymore.
- Q. You may rest assured that I personally will take charge of this and whatever we do among ourselves will not go further. I will instruct the young first lieutenant who talked with you some time ago.
- A. I will do my best. Everything that I know, I will tell you, that's clear. When one does something, one must do the whole job and not only half.
- Q. Whatever you may tell me, no one will know of it, I can assure you.
- A. That is the least I can ask.
- Q. Now let me tell you my plans. I would like to do this as quickly as possible so that you can get away as quickly as possible. I have already written a letter ordering you away, but it may take a few days.

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Now, let's get down to work. Do you recognize these pictures? You probably have seen them already.

A. No, I certainly don't know those, but I can imagin~~e~~ what it is. It is a coding machine M, combined with a typewriter. This picture I know, of course.

Q. It is a coding machine, isn't it?

A. Yes, that is a coding machine; those are the rollers. But they are a little different.

Q. And this?

A. I don't know that either. No, I don't know this one. No.

Q. Do you know this coding machine?

A. Yes, that is the normal coding machine, but it is already antiquated. It is not used any more.

Q. But that is the usual coding machine?

A. Yes, but they are now antiquated. They are not used any longer. There is a fourth roller here, the so-called Beta-roller, as it is called, in addition.

Q. After the Greek?

A. Yes, after the Greek letter. That is here on the side. Instead of three, there are four rollers in it. The fourth roller is always set for a fixed letter.

Q. Always?

A. In this picture there are only three and that is the fourth. As on this picture.

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- Q. Is that the coding machine which you had on the U-boat?
- A. Yes, we had that on the U-boat. Of course, we didn't have those letters on them any longer. We probably had them for emergencies. But there was too much to study. Now one uses it like a teletype. You know a teletype machine, don't you? Well, one punches on it with tin apparatus with rods. That is attached up on the right. Whenever one presses a key, then the corresponding letter appears. But that has nothing to do with the coding machine. If you place any value on it, it is the same.
- Q. And this?
- A. Those are the rollers, the normal type of rollers, with which you are probably familiar. But, as I have already said, this apparatus I saw in Kiel.
- Q. Are these also coding machines?
- A. Yes, of different kinds.
- Q. But this one here is the one you had on the boat?
- A. Yes, that is usually used in the Navy. That is uniform. But I don't know whether one uses these things (rollers) or whether they work exactly like this one.
- Q. They all work pretty much the same?
- A. Yes. I heard a rumor once that they were studying something new in the field, but I don't know how that works.
- Q. There was a book published about it, for it is pretty generally known that this machine is in use.
- A. Well, you also captured a boat from us, but I don't know whether the radio men gave any information, or whether they destroyed the machines.

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- Q. No, that was the U-570 and nothing was destroyed on it. That was Rolmann's boat.
- A. But Rolmann is still alive. Or else it must be very recent. When I was at the U-boat school in Gotenhafen, Rolmann was instructor for U-boat tactics.
- Q. I thought it was the U-570. Then I heard something about U-569 too. That was the sister ship to the 570.
- A. Yes, and in our case you didn't know anything at first either. Wosnitzka told all that. You knew the big boats, but you didn't know that we had mines.
- Q. Well, we knew a little about the boats. We have all kinds of information already.
- A. That has become clear to me here in the meantime. I am quite clear about that. Would you answer one question for me, captain?
- Q. Yes.
- A. The officer ^(3WQ-5) [redacted] who lives across the hall, does he work for you too? I know who he is.
- Q. Yes, we have an officer. He is the one who was with the SS.
- A. I knew it. I lived in the same room with him for two days.
- Q. Didn't you have on your boat a new device for the G. S. R.?
- A. For the G. S. R., yes.
- Q. What was it?
- A. It was a so-called "Rund-Dilo".
- Q. Rund-Dilo? (cf. attached sketch)

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- A. That is something everyone would like to know. I told the lieutenant about it when we were together. Later I was sorry for it. Then I thought that he was a stool-pigeon.
- Q. But he didn't understand it either.
- A. After he was gone, it seemed so queer to me. He kept questioning me. It is really a very simple apparatus. The Lieutenant (s.g.) Jones of the Navy had already made a drawing of it, and he asked me what it was. He seemed to think that the thing could be turned, etc. That isn't the case at all.
- Q. But you formerly had an apparatus which you turned?
- A. Yes, we had that. We probably still have those in reserve in case this one failed to function. It goes through a tube, a watertight tube, through the pressure hull into the audition room. That is a very simple apparatus. It is so large, round, and there is a wire net around it.
- Q. Is it round like a ball?
- A. No, round and oval (cf. sketch attached) and then there are two rods which are so long and they stand up so high on the side. It is, of course a very simple construction. One uses it combined now to get the horizontal and the vertical rays at the same time. One doesn't need to switch back and forth on the G. S. R. That is, one doesn't need to on the Metox, although vertical antennae have simplified that nowadays. That is a great advantage. Formerly we always sat there and searched up and down the scale, using now this antenna, now that, etc. Now we don't need to do that.

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- Q. It all comes together at one time?
- A. Yes, horizontal and vertical.
- Q. How is it separated? I mean, how can you tell that so quickly in the control room?
- A. It isn't important at the moment. One can't tell whether it is vertical or horizontal. It is all the same whether it is either. The important thing is that one gets the beam. One can't tell which it is at the time.
- Q. I don't understand these matters at all. I only know a little about them.
- A. It is all the same. Of course, with the Southern Cross, one could tell the direction, but not one hundred percent accurately. Not the horizontals--the verticals. This horizontal antenna also picked up some vertical waves but only partially.
- Q. Could you tell the direction with the Southern Cross?
- A. Yes, but that was pretty complicated. On our boat we didn't do it. The commandant wouldn't let us go in for it. In the first place, it was too uncertain because we didn't know how far off or how close it was. We always quietly submerged, then we were always safe.
- Q. Then you submerged quickly?
- A. Yes; of course, we always first determined whether everything was in order. It happened that we even dived as many as ten times in two hours and that it looked pretty nice in the control room later.
- Q. Could you draw me a picture of the apparatus?
- A. Yes, but I am not very good at drawing.
- Q. Where are the two rods?
- A. They go up perpendicularly here and then it is insulated here with procelain.

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Q. Ah, ha.

A. Here with porcelain and two screws. Then from here two wire leads go off into here with a cover on it. At that point where the two leads enter, they are soldered to the end of the cable and then are led down in an insulated cable. The cable goes down vertically in the tube.

Q. Insulated?

A. Yes, insulated. And here also, and here and then the two rods so high.

Q. I see.

A. They go down right here and are welded to the circular band. That is quite clear. The Navy lieutenant hit on that. If it isn't so, or so, then it must be circular in form. That is quite self-evident.

Q. It looks something like a tambourine, doesn't it?

A. Yes, like a tambourine, only that the two rods are on it also. And then the whole thing rests on porcelain holders. It isn't really a regular porcelain. It is even harder. Those are real antenna insulators. And here the circle is interrupted. It isn't entirely round. It is spaced at one point. That's how it works. Then the two leads run off, one from here—that isn't drawn correctly—and one goes from this side of the gap and the other goes from the other side of the gap of the circular band.

Q. Can you listen in on all frequencies?

A. No, not all. On the Metox, of course, only certain frequencies. Those were the—I have to think back on that a moment—the scale was graduated from zero to one hundred, and that itself from 120—well, I don't want to swear to it—from 120 to 240 cm. Yes, that is correct.

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- Q. Centimeters?
- A. Yes, from 120 to 240 centimeters.
- Q. These frequencies?
- A. These are the frequencies which we could listen to with the Metox which we had.
- Q. We knew that your first difficulties on the boats were the fact that you had your G.S.R. adjusted for English radar.
- A. Yes. I took such a course once. That was in Boulogne. That was the so-called Heights of Margaret. Perhaps it has a different name again now. It is high up on a mountain and one can look over into England. There is such an experimental station there in a bunker and, of course, made bombproof. I don't know whether it is still there. Those who took the course after me didn't go there any more. It is probably somewhere in the middle of France now. Now they have, of course, made some changes in the Metox again. In fact, they have installed the magic eye. Do you know the magic eye?
- Q. Yes; they indicate whether the station is tuned.
- A. There are intermediate frequencies, if you understand anything about that. That is a fairly complicated matter and I can't draw that for you, of course. Your technicians will know about that.
- Q. He knows these things pretty well already.
- A. Well, then there is this magic eye. As soon as a beam comes in, even if one can't hear it. You also have these inaudible frequencies. Even if one can't hear it, it is nevertheless indicated. I don't believe that is

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for rose red (?). I know that I once heard something about a medium red(?).

Q. I don't know about those things.

A. I don't know so very much about that either, but I know about how it works.

Q. Is that effective only on a ---?

A. No, the magic eye is different, of course. This magic eye with its attachments is known as the E111.

Q. E111?

A. E111. That is the tube designation for it in Germany. That is what the thing is called. It is also built into all radio sets now. Now, when I have the sender tuned exactly--that is, when I have the frequency accurately set--then the streak is very narrow. That is influenced by the so-called oscillation of the tubes. There was a grid in there and the then goes through the grid and then affects this streak.

Q. *You can adjust the whole thing very simply?*
Dann koennen Sie das ganz zusammen stellen?

A. That's how it is done. It is really ver simple in itself. Incidentally, it was discovered by a radio mate here, near America.

Q. Discovered? One of your radio mates, or one of ours?

A. I know him; he is a friend of mine, a technician in civilian life and quite a young man still. He was here on the American coast when that first occurred. This inaudible radar. Of course, that was immediately flashed to the U-boats from the headquarters. So he said to himself that will have to be done someway. Then he sat down and began to monkey around with the radio set they had on board. It is called the GH-1012. The Telefunken sender and receiver is in it. And there

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he took that thing out, the tube, you understand, with its socket and installed it in the Metox. Then the thing worked again. He received (a citation) for it from the radio headquarters. I was with him at the U-boat abwehr school in Gotenhafen. That is a school for listeners. We learned to listen there with the GHG and the KDB. But that was only for the radio men. The seamen learned to throw depth charges.

- Q. The KDB (Crystal turning device) has been pretty generally discarded, hasn't it?
- A. Yes, that is true. It was taken off our boat while we were in dock at Bordeaux. I was always against it. I didn't want to have it removed. The amplifier in the KDB was exactly like the one in the GHG (Gruppen Hoch Gerat) and the GHG amplifier went bad, one needed only to exchange them. Then everything was working again. That is why I didn't want to have it taken out.
- Q. It didn't prove to be very good, did it?
- A. The KDB?
- Q. Yes.
- A. I liked to listen with it myself.
- Q. Rather than with the GHG?
- A. At close range one could shoot torpedoes with it to good advantage without seeing anything. That's how exact it was. But only at very close ranges. Nor could you run at high speed. Even the slightest increase in speed makes a difference under water. It never withstood a full speed under water. Perhaps a single half-speed under water or two and there it was finished. That was built in forward on the deck and stood up at about this height (gesturing).

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- Q. Wasn't that of brass?
- A. It was on deck and looked like this.
- Q. Wasn't it made of brass?
- A. Yes, it was made of brass. Like this; then the stem went down, then it got broader here, the shaft went down here, here was the packing box, and then it went down here into the pressure hull. Up here were the six receivers, the six crystal microphones. Then it could be turned. When the ship was going at a good clip, then the swell came up against the receivers and caused tremendous disturbance. Then you couldn't hear. When it was turned toward the side, either starboard or port, there was still some water pressure and the current could hold out by itself. But when one was listening forward, then there is no Water is very (conductive to sound?), as you probably know and then.....
- Q. And how about the GHG?
- A. The GHG is good.
- Q. Isn't that a larger number of receivers?
- A. There are 48 receivers. The Atlas model uses 48 receivers and the Gemag model uses 44, I believe. No, that is backwards: Gemag uses 48 and Atlas 44. Those are the two firms who make the underwater listening devices, Atlas and Gemag. Gemag is in Kiel and Atlas is in Bremen. They build these things.
- Q. Where are they installed on the boat?
- A. Forward on the bow. The boat looks like this: Here is where the bow goes down, like this. This is what the boat looks like; then here

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comes the tower, and they are attached here on the side.

- Q. On both sides?
- A. On both sides. The bow is pointed at the front. The bow is broad and then tapers off toward the front and then, of course, they are installed in a circle and are made in a circular group and thereby you have coverage all around, from back to front, just as the circle shows. That is why it is attached circularly and forward. Now there is said to be a new listening device and that is under the boat. The so-called Kiel, on which the boat rests when it is in the slip; they now have a keel-receiver. I have only heard about it. I don't know anything more exact about it. I saw in the radio reports that it is very good and that the experience they have had with it are supposed to be very good. They are attached below. That is all I know about it, but I cannot swear to it. I have no precise information. That's something new again, so on the bottom. I don't know whether they are installing it on the new ones or not.
- Q. You were formerly on a land based command, weren't you?
- A. Yes.
- Q. In radio service, wasn't it?
- A. Not always. I was a driver for four months only. It had something to do with radio because it was the so-called Naval Command Post in Calais. Perhaps you know the Captain....., the former captain of the Schleswig Holstein. That is the C.O. who fired upon Hela, on the Westerplatte. That is the fellow.

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- Q. That was right at the beginning of the war.
- A. Right at the beginning. The Naval Command Post in Calais was named after him, the Naval Command PostIt was supervised, at least as long as I was there, by the Germans. The whole coast there was under the Naval Command Post. Lindenau, that was in Boulogne already; that was the so-called invasion coast.
- Q. What were your duties at these land stations?
- A. Regular radio traffic. I was in Brest attached to a motorized A. A. unit as radioman. We had all kinds of simple radio traffic to look after. Besides the so-called German DT apparatuses were lined up along the coast and we were in the combat area of —
- Q. DT-Ceraet?
- A. They are called DT apparatus, or else Freya apparatus. They were called so always. Freya is the same as DT apparatus.

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Extract of Interrogations Nos. 354, 356 and 357
5G-55NA

No. 643

HOELIER, Josef - Oberfunkmaat (U-118)

No. 354 Inter. by: Capt. Kretzmann

Nos. 356 and 357 Inter. by: Lts. Hershberger and Bauer

A.N.S.

*Remarks: These three interrogations
have been extracted together because
the facts pertaining to the electric equipment were drawn from
all three. Lt Hershberger has checked on the electrical devices;
it has been impossible to check on the code machine because Lt
Bauer had made that part of the interrogation and Hoelien is no longer
here. A.N.S.*

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Extract of Interrogations Nos. 354, 356 and 357
5G-552A

23 August 1943

No. 643

Estimate of Veracity: Believed to be thoroughly reliable.

Morale:

P/W has been convinced by the I.O. that the struggle is practically hopeless for Germany now that the air attacks are being carried out with overwhelming allied air superiority. He has come to the decision that anything he can do to shorten the war is the greatest service he can render his own country.

Description of Code Machine: (Schluessel "M") - See sketch

When shown pictures of various coding machines, P/W recognized the one used on his submarine, coding Machine "M". This machine has four rollers or discs instead of the three which were in the old coding machines that are now antiquated. On each of the four discs, the alphabet from A to Z is engraved. The adjustment of the 26 letters can only be changed by brass contacts on the flat side of the disc, which make contact with corresponding pins by means of springs. A voltage of 4 volts is applied across the contacts. When a key is pressed, the disc on the very right moves until all the letters are used up, then the next disc begins to move. These discs can be exchanged. A form is prepared telling the operator what discs to use. For instance, discs 2, 3, 5 with the code word Frankfurt means that instead of #2 disc, #4 must be selected. This is only an example. The code word is never written down. The commander gets it verbally from the communications officer. The discs are adjusted where the little white dot is. When 3 is opposite the white dot, then the disc is adjusted to 3. Three discs, known as a disc block, can be inserted;

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one is stationary. The type of disc used on P/W's boat was the "Beta"; there is a later one known as the "Gamma". The stationary disc can only move when the message is too long to be completed by the first three discs. When one of the keys is pressed, the encoded letter will light up on one of the lamps in the middle section of the instrument. The code machine is readjusted at 12 o'clock noon. New discs are inserted and readjusted at this time.

A plug box which is in front of the code machine gets new connections at this time also. It looks like the panel board of a telephone switchboard. The plug connections are changed according to a list. If the latter states change connections 12 to 14, the code word indicates that 7, for instance, has to be added to each number to get the proper connections. This code word also is given orally and is never written down.

Encoding Procedure for Code-Machine "M":

When an operator wishes to encode a message on the code-machine "M", he must first look up the current code word in the Group Identification Book (Kergruppenbuch). The code-word (Stichwort) is never written down but is conveyed by special messenger orally to the U-boat's communications officer who in turn gives it orally to operators. Let us assume, for example, that an operator has been given the code-word "Neptune". He looks up this word in the Radio Procedure Book (Funkverfahren) and finds that it covers the numbers from 215 to 645. The Radio Procedure Book for submarines is called "Triton". He chooses No. 322, looks it up in the Group Identification Book and finds the letter-group, RTF. He chooses a second group of three letters

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from the General Procedure (Verfahren Allgemein). As letters are sent in groups of four, he picks two consonants arbitrarily in order to complete his groups. The "Triton" group is written on the first line with the arbitrarily chosen consonant in the first space from the left; the "General Procedure" group, on the second line with the arbitrarily chosen consonant in the first space from the right. These two complete lines are called "book groups" (Buchgruppen) and appear on the right of the operator's code-sheet. (See figure 1 attached to Interrogation No. 357). The groups are encoded by means of the cipher-card (Tauschtafel - See figure 2 attached to Interrogation No. 357.). The cipher-card is changed every 24 hours at 12 o'clock midnight. It is divided into two parts; on the left appear two-letter groups in alphabetical order, on their right are the code letters for those respective groups. To encode the identification groups, the first two letters on the left of the code sheet (Buchgruppen section) are taken out vertically and are written down horizontally in the Funkspruch section after having been encoded by means of the cipher card.

Before the operator can proceed with his message on the Code Machine "B", the latter must be adjusted to the daily adjustment. The four letters of the clear "Triton" group are pressed in succession on the keys of the code machine. The handwheels to the right of the four windows are turned until these four letters appear in the windows. The operator may now proceed with the text of his message which will appear encoded letter by letter on the lamps as each successive key is pressed down. Formerly it used to be necessary for a second operator to watch the letters as they appeared on the lamps and write them down.

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A new ticker-tape adjustment, an auxiliary instrument, has made this unnecessary.

Communication Procedure:

P/W stated it required approximately four to five minutes to encode a 40 group radio message on the code machine. The radio operator receives the message from the commander whose name also appears in the message as the signature; however, he may also take the U-boat's name or number for signature. When the numbers are given they must be spelled out, since the code machine contains only letters of the alphabet. The heading of the message contains the time group and the number of groups in clear and is repeated at the end of the message. The time-date group is sent twice, the group number three times.

As soon as the short control station receives the radio message completely it repeats the message to see that it is correct and assigns it a control number which is obtained from a block of numbers set apart for a certain wave band; for instance, Ireland wave band was assigned number 100 to 200. When all these numbers have been assigned, they simply start over again. It is then possible for the U-boat to determine by elimination how many messages it did not receive when submerged. By noting the control numbers, the operator can tell exactly how many messages were missed while his ship was underwater. Messages are repeated on short waves 2, 4, 6, 12 and 24 hours after the first transmission. If they are very important, they are repeated again after 48 hours. All messages sent the preceding day come in on the ultra-long wave Ireland band at night from 0 to 3 o'clock. All messages are copied as one can not tell what they contain until decoded.

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The different wave bands are the Ireland Wave Band, American One and Two, African One and Two, the North Sea and the Mediterranean Wave Band. A U-boat may use any wave band for transmitting; however, it receives on the particular wave band in use at the time. There is one coastal wave band known as K-Otto with a frequency of 4655 kilocycles. The Ireland Wave Band changes frequency 6 times in a 24 hour period.

The land control stations have radio names, e.g., the one at Borkum, known as Gustav-Viktor. At 12 noon, it transmits the call and V's for 5 minutes so one can adjust the receiver and transmitter if necessary. Radio silence is maintained for the next 5 minutes so that important messages may be transmitted from the submarines. Messages sent at this time are usually very short and are encoded on the machine. A 4-letter group may indicate, "I have crossed 45° north." All this signal information is printed in the N.B.U. (Nachrichten Bestimmungen fuer U-Boote -- communication directions for submarines). The paper used in printing is all of the water-solvent type (wasserloslich). The paper is red and the ink is of a darker shade red.

P/W stated he never missed a message on any of the war cruises he participated in. Some boats have missed as many as 60 to 70 messages on one trip. A communications report has to be completed when the U-boat enters port. It consists of the quality of the wave length, the quality of the means of communication, and the efficiency of the radio crews. The messages that are missed on a trip are also reported at this time. The commander then has to state whether he failed to receive the messages because of the radio crew's negligence,

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in which case the crew might be punished, or whether the failure was due to the fact that the boat was submerged. The latter was considered to be an adequate excuse.

G.H.G. Device:

When the German U-boats travel submerged, only one radio man is on duty operating the listening device, G.H.G. This device has the pick-up units mounted in the bow end of the U-boat, 49 pick-up cells in all, 24 on each side of the U-boat. (The K.D.B. Device has been discarded in favor of the G.H.G. However, the amplifiers for both devices are interchangeable. There are two models of the G.H.G., one with 48 receivers manufactured by Genag in Kiel, and one with 44 receivers manufactured by Atlas in Bremen.) An individual cell measures 15 cm. in diameter and is very sensitive, being subject to damage when the U-boat is in dry dock; however, when the boat is at sea there is very little chance for damage. The pick-up cells operate into two pre-amplifiers, each containing 24 tubes, type V-12-B-2000. These two amplifiers then feed into the main amplifier which contains all the operating controls and listening devices. All of the cells are wired into the listening room where each one may be tested and, if found defective, disconnected. The sensitivity of the unit is, of course, impaired when individual cells have been disconnected, although the unit will still function when half of the cells are not operating. The device works best when the boat is traveling directly towards the source of the noise. The operator is able to distinguish turbine noise, electric motor noise, diesel motor noise, screw noise and piston noise. It is possible to listen to underwater telegraph, but

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no airplane noises may be heard with this device.

P/W spoke of another new listening device installed on the bottom of the boat or on the keel. It is known as the Kiel Receiver. He has merely seen radio reports on it. He has never operated one or seen it installed, and is not sure whether they are installing them on the new boats.

Radio Equipment: (Submarine)

The Telefunken transmitters and receivers used on U-boats are always calibrated in degrees whereas the Lorenz receivers are calibrated in kilocycles.

The radio direction finder receiver has a frequency range from 200 to 20,000 meters and is used to receive ultra-long waves. The U-boat cannot transmit these waves. It is possible to receive radio messages on the ultra-long waves while submerged to periscope depth of 14 to 15 meters. These frequencies are in the range of 12,000, 13,000, 14,000 meters or 20, 21 23 kilocycles. The land based transmitters which utilize these waves have a power output of 150 to 1,000 kilowatts. P/W has never experienced a situation where he was unable to receive messages sent on these wave lengths.

This U-boat carried an 800 watt automatic short wave transmitter. The short wave transmitter on P/W's submarine was not crystal controlled due to the shortage of crystals in Germany. P/W experienced no difficulty in keeping the frequency constant because he was able to check simply by using the frequency control set which is furnished with every transmitter and calibrated at the factory by the manufacturer. 220 volts A.C. was obtained from dynamotors located by the E Machines.

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A rectifier operated off this 220 volt A.C. source and supplied the various voltages needed for the operation of the transmitter. It took about two seconds to change frequency with this automatic motor switching unit. The transmitter could also be tuned manually. Certain of its sections could be removed for repair by simply moving a lever and pulling out the section. In addition to this 800 watt short wave transmitter, there was a 40 watt auxiliary transmitter on all U-boats transmitting on wave lengths of 17 to 100 meters.

The long wave transmitter had a power output of 150 watts. This transmitter was seldom employed when on a war cruise and P/W was consequently not certain about the wave lengths it used. Its main purpose was to send signals for homing to other submarines or in a case when a submarine was lost. The range of this transmitter is very limited so that it will not interfere with land station; in fact, it is seldom that the land stations are able to hear this transmitter.

P/W's boat carried a short wave receiver, a special Metox short wave receiver, an all wave receiver and a direction finding receiver.

"Rund-Dilo" (See Attached Sketch)

A new type of antenna was installed for the G.S.R. known as the "Rund-Dilo". It receives the horizontal and vertical polarized waves simultaneously, thus eliminating the extra operating procedure of switching back and forth from the horizontal to the vertical antenna, such being the case for the cross type antenna previously installed. This is a non-directional antenna; it only picks up a signal which warns a U-boat that it is being detected, but it does not tell

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from what direction. The antenna consists of two circular metal rings of identical diameter, connected by a wire mesh screen. The circle is broken and insulated and the two lead-in wires are connected at this point. This ring is mounted horizontally with two vertical metal rods mounted on opposite sides of the horizontal ring. (Dimensions are indicated on the sketch.)

This antenna picks up frequencies from 120 cm to 240 cm, which is the range of the Metox receiver. The condensers used in the construction of this receiver are of American manufacture and, according to the P/W, were always causing trouble by short circuiting. He believes the Americans are technically more advanced but that Germany is superior in the exactness of workmanship and sturdiness of construction. The receiver also contains a new electric tuning device, the magic eye, which indicates all signals whether audible or not, by narrowing its beam on the screen, thereby eliminating the necessity of listening to the receiver with the headphones at all times. This tuning eye is known as the EL 11 tube. When P/W's boat was attacked, this receiver was not in operation. It was a very clear day and the commander had given orders to switch this equipment off. When the boat went down, the short wave receiver was still functioning. This system of detection was perfected by a radio man on a U-boat that was on a war cruise near the American coast. He received a citation for it.

Auxiliary Antenna for Direction Finding:

This is a telescoping rubberized pole antenna which can be raised from the control room to a height of six to seven meters. Only a small section of this antenna which is situated to the left of the

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tower need protrude above the water to allow of transmission and reception by the operator while the submarine is still submerged. The antenna operates like a periscope, is about as thick as the latter and is so arranged that the electric cable winds and unwinds as the antenna is retracted and extended. The transmitting section of this antenna is covered with waterproofing rubber.

Method of Contacting another U-boat at Sea:

The procedure for contacting U-boats is changed approximately every three months. Before P/W was captured, the procedure was as follows:

When two U-boats want to meet, the shore station sends a message by short wave radio stating which one is to send the homing beams. The transmitting boat then sends the following messages or signals for five minutes every quarter hour until mission is accomplished: Victors are sent for one minute followed by the U-boat radio-name and code-name, then victors are sent for the remaining period. Another method is to take code groups out of the signal book and communicate by means of long waves on the direction finding device. This method which was both dangerous and complicated was used only in cases of necessity as a last resort.

P/W's boat never contacted another U-boat by this method, he communicated with the shore station only.

Freya-Geract:

P/W calls the Freya-Geract "DT-Geract" and states that these instruments were lined up along the French coast.

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Experimental Radio Station:

P/W took course in detecting Radar signals near Boulogne at the Heights of Margaret. The station was installed in a bomb proof shelter. He believes it may have been moved farther inland because those who took the course after him were not sent there.

Discipline of Germans in France:

German soldiers in France are severely punished for small offenses. P/W attended court martial in Bordeaux and heard sentences totaling 75 years of imprisonment inflicted in one day for offenses varying from stealing a spoon to striking a Frenchman. In all the occupied countries the strictest discipline was maintained.

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